REMARKS

The application has been reviewed in light of the Office Action dated May 3, 2006. Claims 94-106 are pending, with claims 1-93 having previously been canceled, without prejudice or disclaimer. By this Amendment, claim 94 has been amended to clarify the claimed invention. The Office Action indicated that claims 96-106 have been allowed. Accordingly, claims 94 and 95 are presented for reconsideration, with claim 94 being in independent form.

Claims 94 and 95 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over U.S. Patent No. 6,136,626 to Kidoguchi in view of U.S. Patent No. 6,456,640 to Okumura and further in view of U.S. Patent No. 5,868,837 to DiSalvo.

Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claim 94 is patentable over the cited art, for at least the following reasons.

Independent claim 94 is directed to an optical semiconductor device comprising a bulk crystal substrate of GaN which in turn comprises a slab of a GaN single crystal produced by forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux contains Ga in addition to said volatile metal element, growing GaN in the form of a single crystal body in said molten flux, and supplying a compound containing N directly into the atmosphere in said reaction vessel from a source located outside said reaction vessel during growth of said GaN single crystal. The slab of GaN single crystal produced by such a process wherein the compound containing N is continuously supplied during the growth of the GaN, and the pressure inside the reaction vessel is maintained generally constant during the growth of the GaN crystal once the state of the reaction vessel is stabilized, allows the device to have high

quality and to be used as, for example, a laser diode, with large optical power.

Kidoguchi, as understood by Applicant, proposes a semiconductor light-emitting device including a sapphire substrate, an active layer made of $Ga_{1-x}In_xN$ doped with a p-type impurity and an n-type impurity, and first and second cladding layers, with the active layer sandwiched between the first and second cladding layers.

As acknowledged in the Office Action, Kidoguchi does not involve and does not disclose or suggest an optical semiconductor device comprising a bulk crystal substrate of GaN.

Okumura, as understood by Applicant, proposes a gallium nitride type semiconductor laser device comprising a substrate, an active layer of a nitride type semiconductor material which is interposed between a pair of nitride type semiconductor cladding or guide layers.

Although Okumura proposes that the substrate can be a GaN substrate, Okumura, like Kidoguchi, as acknowledged in the Office Action, does not disclose or suggest an optical semiconductor device comprising a bulk crystal substrate of GaN which in turn comprises a slab of a GaN single crystal produced by forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux contains Ga in addition to said volatile metal element, growing GaN in the form of a single crystal body in said molten flux, and supplying a compound containing N directly into the atmosphere in said reaction vessel from a source located outside said reaction vessel during growth of said GaN single crystal.

DiSalvo, as understood by Applicant, proposes an approach for preparing GaN single crystals wherein gallium and nitrogen are reacted in a sodium flux at a temperature ranging from 600° to 850° in a reaction system containing gallium, sodium, and nitrogen. DiSalvo, Example II, proposes use of an autoclave constructed of stainless steel tubing wherein a bottom end is

sealed with a plug of stainless steel and a top end is sealable and is fitted with a copper reflux condenser. It should be noted that in the approach proposed by DiSalvo, the autoclave is closed during the crystal growth of the GaN crystal. DiSalvo, column 4, lines 35-41 proposes that the autoclave be sealed and inserted into a furnace, and the pressure rises from 27atm before heating to 68atm after reaching the temperature of 810°C (as expected under Boyles-Charles law).

In contrast, amended claim 94 of the present application provides for continuing supplying the compound containing N into the reaction vessel, and as a result of the supply of the nitrogen compound, the growth of the GaN crystal continues while consuming the newly supplied nitrogen compound and it becomes possible to grow a larger GaN crystal as compared with the approach proposed by DiSalvo.

Further, it should be noted that in the subject matter covered by amended claim 94 of the present application, since the compound containing N is continuously supplied during the growth of the GaN, the pressure inside the reaction vessel is maintained generally constant during the growth of the GaN crystal once the state of the reaction vessel is stabilized (see, for example, specification, page 15, line 7: "the pressure inside the reaction vessel is regulated to a moderate value of about 5 MPa by controlling the valve 109").

Applicant simply does not find disclosure or suggestion in the cited art of an optical semiconductor device comprising a bulk crystal substrate of GaN which in turn comprises a slab of a GaN single crystal produced by forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux contains Ga in addition to said volatile metal element, growing GaN in the form of a single crystal body in said molten flux, and supplying a compound containing N directly into the atmosphere in said reaction vessel from a source located

outside said reaction vessel during growth of said GaN single crystal, as provided by amended claim 94.

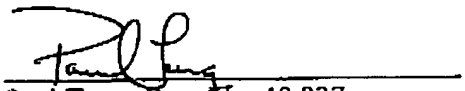
Accordingly, for at least the above-stated reasons, Applicant respectfully submits that claims 94 and 95 are patentable over the cited art.

In view of the remarks hereinabove, Applicant submits that the application is now in condition for allowance. Accordingly, Applicant earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,



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